54

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/783,787	02/15/2001	Ravisankar Pudipeddi	MSFT-0219/147298.1	3041

27372 7590 03/18/2003

WOODCOCK WASHBURN KURTZ
MACKIEWICZ & NORRIS LLP
ATTENTION: STEVEN J. ROCCI, ESQ.
ONE LIBERTY PLACE, 46TH FLOOR
PHILADELPHIA, PA 19103

EXAMINER	
EHICHIOYA, FRED I	
ART UNIT	**PAPER NUMBER**
2172	

DATE MAILED: 03/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/783,787	PUDIPEDDI ET AL.	
	Examiner	Art Unit	
	Fred I. Ehichioya	2172	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. The application has been examined. Claims 1 – 40 are pending in this office action.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

3. Claims 1 – 4, 7, 11, 12, 17, 18, 19, 20, 24, 25, 26, 28, 31 are rejected under 35 U.S.C 102(e) as been anticipated by U.S. Patent 6,480,971 issued to Matsumoto et al. (hereafter "Matsumoto").

Regarding claim 1, Matsumoto teaches a method of managing a plurality of data storage media, each of said media being designatable as being in a writeable state or a non-writeable state, said method comprising:

designating a quantity of said plurality of media as being in the writeable state, said quantity being equal to a concurrency value ("the media library apparatus in accordance with a preferred embodiment includes a plurality of (six in the illustrated example) library units U1-U6 that are simultaneously activated in response to data read/write control instructions" see column 5, lines 43 – 47);

determining that none of the media designated in the writeable state has sufficient space to store specified data ("too many regular sectors are defective, empty areas gradually run out in the substitute sector, as a result of which data can not be written into the substitute sector any longer. In such a case, the controller writes the data into the management region by determining that no more data writing can be made to the substitute sector", see column 4, lines 11 – 16);

designating an additional one of said plurality of media as being in the writeable state whereby the aggregate number of media in the writeable state exceeds said concurrency value ("Thus allowing the management region to have the function as the substitute sector can effectively supplement the limited capacity of data areas of the substitute sector, which, in turn, allows the data striping process to be appropriately carried on even after the capacity of the substitute sector has been used up", see column 4, lines 18 – 23); and

writing said specified data to the additional medium ("the controller writes the desired data into the substitute sector of that media", see column 4, lines 10 – 11).

Regarding claim 2, Matsumoto teaches retrieving, from a database, a record corresponding to each medium in the writeable state ("data necessary for the updating the management information is retrieved from the management information of the medium which has the newest count information", see column 4, lines 62 – 65), said database storing a record corresponding to each of said media that is in either the writeable state or the non-writeable state ("a data-storing management region is set

separately from the substitute sector, and wherein the controller performs control such that when there arises a situation where desired data can not be written onto any one of the media in data write processing based on the data striping process, the data write processing can be carried on using the management region", column 3, lines 60 – 67), each of said records indicating for each medium that is in the writeable state the amount of space available for writing on said medium ("it is possible for the user to ascertain presence/absence of any necessary empty area prior to the data write processing", column 4, lines 23 – 28); and

comparing the amount of free space indicated by each record with the size of said specified data ("comparison is made at step S4 between the respective counters (first and second counters) of the first and second management information regions", column 7, 50 - 52).

Regarding claim 3, Matsumoto teaches plurality of media includes one or more non-designated media that are not in either the writeable state or the non writeable state ("too many regular sectors are defective, empty areas gradually run out in the substitute sector, as a result of which data can not be written into the substitute sector any longer. In such a case, the controller writes the data into the management region by determining that no more data writing can be made to the substitute sector", see column 4, lines 11 – 16), and wherein said database does not contain entries for said non designated media ("The above-mentioned substitute sector region is where data is written as a substitute for the data region when there is found a trouble-plagued area,

i.e., a defective sector. Namely, the substitute sector region can be said to be an auxiliary or spare data region functioning as an insurance against a possible failure in the regular data region. However, in the present invention, a user is not allowed to designate the substitute sector region for data writing", column6, lines 50 – 58).

Regarding claim 4, Matsumoto teaches plurality of media are mountable on one or more drives, said drives being associated with a device, said device having a library which stores media and a robotic mechanism which mounts media stored in said library on said drives, and wherein said determining act comprises:

determining that none of said plurality of media in the writeable state located within said device has sufficient space to store said specified data ("too many regular sectors are defective, empty areas gradually run out in the substitute sector, as a result of which data can not be written into the substitute sector any longer. In such a case, the controller writes the data into the management region by determining that no more data writing can be made to the substitute sector", see column 4, lines 11 – 16); and

determining that none of said plurality of media located outside of said drive is in the writeable state ("The above-mentioned substitute sector region is where data is written as a substitute for the data region when there is found a trouble-plagued area, i.e., a defective sector. Namely, the substitute sector region can be said to be an auxiliary or spare data region functioning as an insurance against a possible failure in the regular data region. However, in the present invention, a user is not allowed to designate the substitute sector region for data writing", column6, lines 50 – 58).

Regarding claim 7, Matsumoto teaches concurrency value is equal to a to number of drives that are available for the migration of data ("the media library apparatus in accordance with a preferred embodiment includes a plurality of (six in the illustrated example) library units U1-U6 that are simultaneously activated in response to data read/write control instructions", column 5, lines 43 – 47; "write instructions are sent to the individual drive devices at step S15, so that write processing is carried out at step S16 in the drive devices concurrently in a parallel fashion. FIG. 3 is a flow chart showing an example of a write process thus performed at step S16 in each of the drive devices", column 9, lines 1 - 5)

Claims 11 is essentially the same as claim 1 except that it sets forth the claimed invention as a computer-readable medium having computer-executable instructions rather than a method and therefore rejected for the same reasons as applied hereinabove.

Regarding claim 12, Matsumoto teaches a method of using a plurality of media for a data migration system, each of said media being designatable as being in a writeable state or a non-writeable state, said method comprising:

receiving a request to migrate a quantity of data ("when data write instructions are received from the higher-order processor or from the control panel P manipulated by the user", column 7, lines 41 - 43);

identifying, from among said plurality of media, a set of media that are in the writeable state ("At fist step S1, desired media are selectively taken out of the respective storage shelves in all the library units U1-U6 and then transported to and inserted in the associated drive devices", column 7, lines 43 – 46) and that have sufficient space to store said quantity of data ("it is possible for the user to ascertain presence/absence of any necessary empty area prior to the data write processing", 4, lines 26 – 28);

determining that each of the media in said set is in use for the reading or writing of data ("Therefore, for each of the media inserted in the drive devices, a determination is made as to which of the first and second management information regions the latest information is retained in, or as to whether the latest information is retained in both of the first and second management information regions", column 7, line 67 and column 8, lines 1 – 5);

determining that the number of said plurality of media in the writeable state is greater than or equal to a first number ("Next, a comparison is made at step S4 between the respective counters (first and second counters) of the first and second management information regions, so that one of the counted values of the counters (first or second counter) which is greater than the other is retained in a memory as a newest count at step S5 or S6", column 7, lines 50 – 55);

waiting for a medium from said set to become available ("Therefore, for each of the media inserted in the drive devices, a determination is made as to which of the first and second management information regions the latest information is retained in, or as

to whether the latest information is retained in both of the first and second management information regions", column 7, line 67 and column 8, lines 1 – 5); and

writing said data to the available medium ("the controller writes the desired data into the substitute sector of that media", column 4, lines 10 – 11).

Regarding claim 17, Matsumoto teaches said data migration system includes a device having one or more drives which read and write said plurality of media, a library for the storage of media, and a robotic mechanism which mounts media stored in said library on said drives, said method further comprising:

determining that none of the media located in said library is in the writeable state ("too many regular sectors are defective, empty areas gradually run out in the substitute sector, as a result of which data can not be written into the substitute sector any longer. In such a case, the controller writes the data into the management region by determining that no more data writing can be made to the substitute sector", see column 4, lines 11 – 16).

Regarding claim 18, Matsumoto teaches said data migration system includes a device having one or more drives which read and write said plurality of media, a library for the storage of media, and a robotic mechanism which mounts media stored in said library on said drives, said method further comprising:

determining that none of said plurality of media located outside of said device is in the writeable state ("too many regular sectors are defective, empty areas gradually

run out in the substitute sector, as a result of which data can not be written into the substitute sector any longer. In such a case, the controller writes the data into the management region by determining that no more data writing can be made to the substitute sector", see column 4, lines 11 – 16).

Claims 19 is essentially the same as claim 12 except that it sets forth the claimed invention as a computer-readable medium having computer-executable instructions rather than a method and therefore rejected for the same reasons as applied hereinabove.

Regarding claim 20, Matsumoto teaches a method of using a plurality of double-sided media for a data migration system, each side of said media being designatable as being in a writeable state or a non-writeable state, said method comprising:

receiving a request to migrate a quantity of data ("when data write instructions are received from the higher-order processor or from the control panel P manipulated by the user", column 7, lines 41 - 43);

identifying, from among said plurality of media; a first set of media having a side in the writeable state ("At fist step S1, desired media are selectively taken out of the respective storage shelves in all the library units U1-U6 and then transported to and inserted in the associated drive devices", column 7, lines 43 – 46) and whose side in the writeable state has sufficient space to store said quantity of data ("it is possible for the

user to ascertain presence/absence of any necessary empty area prior to the data write processing", 4, lines 26 – 28);

determining that each of said media in said first set is in use for the reading or writing of data ("Therefore, for each of the media inserted in the drive devices, a determination is made as to which of the first and second management information regions the latest information is retained in, or as to whether the latest information is retained in both of the first and second management information regions", column 7, line 67 and column 8, lines 1 – 5);

identifying a first one of said plurality of media which is not in use for the reading or writing of data ("The counter is incremented in its value by one each time data of the first or second management information region is loaded or unloaded, i.e., written or read, to or from the medium", column 7, lines 1 – 4), and which has a first side that is in the nonwriteable state ("Therefore, the sector number "481", for example, designates the 81st sector of one of the media inserted in the drive device of the library unit U4, i.e., the first sector in the management first information management region", column 7, lines 28 – 31) and a second side whose state is not designated ("the data designated by the instructions is not the one held in the memory as determined at step 12", column 7, lines 58 – 60);

designating said second side of said first medium as being in the writeable state ("Once all the designated data have been written onto the medium (the data region or the substitute sector region) or into the memory (the management information), a value

"1" is added to the counter of the management information in the memory at step S19", column 9, lines 50 – 55); and

writing said data to said second side of said first medium ("latest data is always written in either one of the first and second management information regions which has the greater counter-counted value', column 7, lines 64 – 66).

Claims 24 is essentially the same as claim 20 except that it sets forth the claimed invention as a computer-readable medium having computer-executable instructions rather than a method and therefore rejected for the same reasons as applied hereinabove.

Regarding claim 25, Matsumoto teaches A method of storing a quantity of data on one of a plurality of media, each of said media being designatable as being in a writeable state or a non-writeable state, said method comprising:

determining that the number of said media in a writeable state is greater than or equal to a first number ("Next, a comparison is made at step S4 between the respective counters (first and second counters) of the first and second management information regions, so that one of the counted values of the counters (first or second counter) which is greater than the other is retained in a memory as a newest count at step S5 or S6", column 7, lines 50 – 55);

determining whether any of said media in a writeable state ("At fist step S1, desired media are selectively taken out of the respective storage shelves in all the

library units U1-U6 and then transported to and inserted in the associated drive devices", column 7, lines 43 – 46) have sufficient space to store said data ("it is possible for the user to ascertain presence/absence of any necessary empty area prior to the data write processing", 4, lines 26 – 28);

if any of said media in a writeable state have sufficient space to store said data, writing said data to a first of said media in the writeable state ("the controller writes the desired data into the substitute sector of that media", column 4, lines 10 – 11); and

if none of said media in said writeable state have sufficient space to store said data:

identifying a second medium, said second medium not being designated as being in either the writeable state or the non-writeable state ("If, on the other hand, the data has not been appropriately written, an affirmative (YES) determination is made at step S30 and if there is an empty, i.e., available, area in the substitute sector region in the medium (YES determination of step S31), the processing proceeds to step S32 to write the data into the substitute sector region", column 9, lines 13 – 19);

designating said second medium as being in the writeable state ("Once all the designated data have been written onto the medium (the data region or the substitute sector region) or into the memory (the management information), a value "1" is added to the counter of the management information in the memory at step S19", column 9, lines 50 – 55); and

writing said data to said second medium ("latest data is always written in either one of the first or second management information regions", column 7, lines 64 – 66).

Regarding claim 26, Matsumoto teaches determining that said first medium is presently in use for the reading and writing of data (see column 6, lines 63 – 67 and column 7, lines 1 – 4); and

waiting for said first medium to become available prior to writing said data to said first medium (see column 8, lines 19 – 23).

Regarding claim 28, Matsumoto teaches first medium is presently in use for the reading or writing of data, and wherein said waiting act comprises:

waiting for said use to complete (see column 8, lines 19 – 23).

Claims 31 is essentially the same as claim 25 except that it sets forth the claimed invention as a computer-readable medium having computer-executable instructions rather than a method and therefore rejected for the same reasons as applied hereinabove.

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 32, 33, 35, 39, 40 is rejected under 35 U.S.C 102(b) as been anticipated by U.S. Patent 5,537,585 issued to Blickenstaff et al. (hereafter "Blickenstaff")

Regarding claim 32, Blickenstaff teaches a system for storing data on media comprising:

a media management module which communicates with a database that stores attributes of a plurality of media ("The data storage management system implements a virtual data storage system, comprising a plurality of virtual file systems, for the processors that are connected to the network. The virtual data storage system consists of a first section that comprises a plurality of data storage subsystems, each consisting of file servers and their associated data storage devices, which are connected to the network and serve the processors", column 2, lines 22 – 29), and which selects media for writing in accordance with the attributes stored in said database ("the migration candidate data file is selected by the operations kernel 501 and removed from the managed volume of data storage device 31, after transmitting the data file via network interface 503, the data communication link 11 of network 1 and network interface 502 to the storage server 50 and checking that the data file has been transferred correctly. Storage server 50 thus writes the transfer unit containing the transferred data file

column 11, lines 33 – 41), said media management module including logic which selects said media based on a concurrency value ("The data management system software of the present invention manages the flow of data files throughout the system", column 8, lines 51 – 53); and

a migration module which communicates with a storage device ("a hierarchical data storage capability to migrate lower priority data files from the data storage subsystems that are connected to the network to backend less expensive data storage media, such as optical disks or magnetic tape", column 2, lines 15 – 18), said storage device including a plurality of drives which write data to said media ("the secondary storage 52 is divided into at least one and more likely a plurality of layers 311-313, generally as a function of the media used to implement the data storage devices 61-65. In particular, the second layer 311 of the hierarchical data storage, which is the first layer of the secondary storage 52, can be implemented by high speed magnetic storage devices 61. Such devices include disk drives and disk drive arrays", column 6, lines 38 – 45), said migration module receiving an indication of a selected medium from said media management module ("the storage server 51 retrieves the physical storage location data from the secondary storage directory associated with the requested data file. This data includes an identification of the media element 72 that contains the requested data file", column 7, lines 50 – 54) and writing data to the selected medium using said storage device ("The storage server processor 51 tracks the partial nature of the transfer unit. The use of the partial transfer unit write process reduces the window of

vulnerability since migrated data files are written to backup media on a periodic and timely basis", column 14, lines 47 – 51).

Regarding claim 33, Blickenstaff teaches a selection module which communicates with a data object storage system and which selects data objects from said data object storage system to be written to said media ("the migration candidate data file is selected by the operations kernel 501 and removed from the managed volume of data storage device 31, after transmitting the data file via network interface 503, the data communication link 11 of network 1 and network interface 502 to the storage server 50 and checking that the data file has been transferred correctly. Storage server 50 thus writes the transfer unit containing the transferred data file column 11, lines 33 – 41).

Regarding claim 35, Blickenstaff teaches a persistence module which receives from said migration module the location at which said data is stored on said media, and which stores the location of said data in a memory location ("the storage server 51 retrieves the physical storage location data from the secondary storage directory associated with the requested data file. This data includes an identification of the media element 72 that contains the requested data file. The physical location of this media element 72 is dependent on the data read/write activity and configuration of the system", column 7, lines 50 – 56).

Regarding claim 39, Blickenstaff teaches plurality of media comprise double-sided media, each side of said media being designatable as being in either a writeable state or a non-writeable state ("Such devices include optical disk drives and robotic media storage and retrieval library systems", column 6, lines 53 – 54), wherein said media management module further comprises logic which selects a medium based which of said plurality of media has a side in the non-writeable state ("The data management system software of the present invention manages the flow of data files throughout the system", column 8, lines 51 – 53).

Regarding claim 40, Blickenstaff teaches a system for migrating data to media comprising:

selection means for selecting data to be written to media ("The space management procedures can include a plurality of concurrently operational space management rules. Thus, data files can be selected for migration as a function of the time of last access, size, quantity of data storage space available on the network volume", column 9, line 67 and column 10, lines 1 – 4);

first data storage means for storing attributes of said media ("", column 11, lines 12 – 14), said attributes including whether each medium is allocated for writing ("The contents of all the network volumes stored in data storage device 31 which is part of file server 41 are listed in directory 511. File system manager 521 typically manages directory 511, which lists the data file, its storage location and attributes. Operations kernel 501 at step 603 orders all the data files in each managed network volume in a

predetermined manner into a priority list, such as a least recently used list. The bottom entries of the list represent the present migration candidate set. The migration candidates are selected based on a number of data file attributes, such that the set of management candidates are of sufficient extent to provide sufficient free data storage space to satisfy the free space objectives for this managed network volume", column 11, lines 12 – 24), whether each medium is double-sided, and whether each medium is robotically accessible ("Such devices include optical disk drives and robotic media storage and retrieval library systems", column 6, lines 53 – 54);

second data storage means for storing concurrency information ("The space management procedures can include a plurality of concurrently operational space management rules. Thus, data files can be selected for migration as a function of the time of last access, size, quantity of data storage space available on the network volume. If management rules allow more data files to be migrated from a selected network volume to secondary storage 52 than required to reach the optimal level, these additional data files are "pre-migrated" to secondary storage 52", column 9, line 67 and column 10, lines 1 – 8);

media management means for choosing a medium to which to write the selected data based on said attributes and said concurrency information ("the migration candidate data file is selected by the operations kernel 501 and removed from the managed volume of data storage device 31, after transmitting the data file via network interface 503, the data communication link 11 of network 1 and network interface 502 to the storage server 50 and checking that the data file has been transferred correctly.

Storage server 50 thus writes the transfer unit containing the transferred data file", column 11, lines 33 – 41); and

transferring means for transferring the selected data to the chosen media ("the data communication link 11 of network 1 and network interface 502 to the storage server 50 and checking that the data file has been transferred correctly", column 11, lines 37 – 39).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 5, 14, 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto in view of Blickenstaff.

Regarding claim 5, Matsumoto teaches plurality of media are mountable on one or more drives, said drives being associated with a device, said device having a library which stores media and a robotic mechanism which mounts media stored in said library on said drives, and wherein said determining act comprises:

determining that none of said plurality of media in the writeable state located within said device has sufficient space to store said specified data ("too many regular

sectors are defective, empty areas gradually run out in the substitute sector, as a result of which data can not be written into the substitute sector any longer. In such a case, the controller writes the data into the management region by determining that no more data writing can be made to the substitute sector", see column 4, lines 11 – 16);

identifying a first medium located outside of said device, the identified medium being in the writeable state ("the data section includes four major regions, i.e., a data region, a first management information region, a second management information region and a substitute sector region. The data region is one which is first accessed when data is to be written and where the data is actually written as long as there is no trouble, i.e., abnormal condition or defect, in the region. The above-mentioned substitute sector region is where data is written as a substitute for the data region when there is found a trouble-plagued area", column 6, lines 44 – 53);

determining, based on the re-evaluation, that none of said plurality of media in the writeable state has sufficient space to store said specified data ("too many regular sectors are defective, empty areas gradually run out in the substitute sector, as a result of which data can not be written into the substitute sector any longer. In such a case, the controller writes the data into the management region by determining that no more data writing can be made to the substitute sector", see column 4, lines 11 – 16).

Matsumoto does not explicitly teach determining that an amount of time has passed without the identified medium having been placed in said device; re-evaluating said plurality of media.

Blickenstaff teaches determining that an amount of time has passed without the identified medium having been placed in said device ("the storage server 50 may provide the user with a notification where necessary that a time delay may be noted in accessing the requested data file", column 5, lines 44 – 46);

re-evaluating said plurality of media ("The data file retirement process examines the time of last access for each data file that is retired and places an entry in the retirement directory that corresponds to this temporal partition", column 8, lines 41 – 44).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified teaching of Matsumoto combine with the teaching of Blickenstaff wherein a time delay during the last access of data files signifies that no medium has been place on the device. The temporal partition is a temporal storage for files to be written or accessed. As a result data could be stored on this temporal partition to avoid time delay even if the medium is not mounted on the device.

Regarding claim 14, Matsumoto does not explicitly teach said data comprises a plurality of data objects, and wherein said method further comprises persisting in a memory the locations

Blickenstaff teaches said data comprises a plurality of data objects, and wherein said method further comprises persisting in a memory the locations ("Data files that are of lower priority are migrated via the network and the storage server to backend data storage media. The data file directory resident in the data storage device that originally

contained this data file is updated with a placeholder entry in the directory to indicate that this data file has been migrated to backend data storage", column 2, lines 38 – 44) to which each of said data objects has been migrated ("the storage server 51 retrieves the physical storage location data from the secondary storage directory associated with the requested data file", column 7, lines 50 – 52).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified teaching of Matsumoto combine with the teaching of Blickenstaff wherein when a processor requests this data file, the placeholder entry is retrieved from the directory and the storage server is notified of the request. Consequently, this matches the need of low cost mass storage device.

Regarding claim 15, Blickenstaff teaches said location comprises an identifier which identifies said medium and an offset from a specified location on said medium ("the storage server 51 retrieves the physical storage location data from the secondary storage directory associated with the requested data file. This data includes an identification of the media element 72 that contains the requested data file", column 7, lines 50 – 54).

8. Claims 34 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blickenstaff in view of Matsumoto.

Regarding claim 34, Blickenstaff does not explicitly teach selection module selects data objects based on the time said data objects were most recently accessed.

Matsumoto teaches selection module selects data objects based on the time said data objects were most recently accessed ("Therefore, for each of the media inserted in the drive devices, a determination is made as to which of the first and second management information regions the latest information is retained in, or as to whether the latest information is retained in both of the first and second management information regions", column 7, line 67 and column 8, lines 1 – 5).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified teaching of Blickenstaff combine with the teaching of Matsumoto wherein first and second management information regions is updated time the drive device makes access to the medium. This allows the latest data to always to be written in either the first or the second management information region.

Regarding claim 37, Blickenstaff does not explicitly teach concurrency value is equal to the number of drives in said storage device.

Matsumoto teaches concurrency value is equal to the number of drives in said storage device ("the media library apparatus in accordance with a preferred embodiment includes a plurality of (six in the illustrated example) library units U1-U6

that are simultaneously activated in response to data read/write control instructions", column 5, lines 43 – 47; "write instructions are sent to the individual drive devices at step S15, so that write processing is carried out at step S16 in the drive devices concurrently in a parallel fashion. FIG. 3 is a flow chart showing an example of a write process thus performed at step S16 in each of the drive devices", column 9, lines 1 - 5).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified teaching of Blickenstaff combine with the teaching of Matsumoto wherein six as in the illustrated example represents the concurrency value. The drive devices are activated concurrently in parallel fashion in order to carry out the data read/write processing while performing the data striping process.

9. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Blickenstaff in view of U.S. Patent 6,493,787 issued to Yamamoto et al. (hereafter "Yamamoto").

Regarding claim 36, Blickenstaff does not explicitly teach each of said data objects is a file stored in a file system, and wherein said persisting act comprises: setting a reparse point in said file system for each of the files; and storing the location of each migrated file in the reparse point 20 corresponding to the migrated file.

Yamamoto teaches each of said data objects is a file stored in a file system, and wherein said persisting act comprises:

setting a reparse point in said file system for each of the files ("The serial interface 62 prescribes a protocol for performing arbitrary data transfer over three signal

lines between the serial interface 62 and the plateshaped memory 1, that is, signal lines SCLK (serial clock signal), BS (bus state) and SDIO (serial data input/output)", column 5, lines 65 – 67 and column 6, lines 1 – 2); and

storing the location of each migrated file in the reparse point 20 corresponding to the migrated file ("the user can reproduce only an arbitrary track from among tracks recorded in one or a plurality of plate-shaped memories 1 loaded in the drive apparatus 20", column 16, lines 22 – 24).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified teaching of Blickenstaff combine with the teaching of Yamamoto wherein a reparse point is essentially a storage location for arbitrary data. Consequently, storing arbitrary data in this location allows for read/write on only designated data.

10. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto and Blickenstaff in view of Yamamoto.

Regarding claim 16, Matsumoto or Blickenstaff does not explicitly teach each of said data objects is a file stored in a file system, and wherein said persisting act comprises: setting a reparse point in said file system for each of the files; and storing the location of each migrated file in the reparse point 20 corresponding to the migrated file.

Yamamoto teaches each of said data objects is a file stored in a file system, and wherein said persisting act comprises:

setting a reparse point in said file system for each of the files ("The serial interface 62 prescribes a protocol for performing arbitrary data transfer over three signal lines between the serial interface 62 and the plateshaped memory 1, that is, signal lines SCLK (serial clock signal), BS (bus state) and SDIO (serial data input/output)", column 5, lines 65 – 67 and column 6, lines 1 – 2); and

storing the location of each migrated file in the reparse point 20 corresponding to the migrated file ("the user can reproduce only an arbitrary track from among tracks recorded in one or a plurality of plate-shaped memories 1 loaded in the drive apparatus 20", column 16, lines 22 – 24).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified teaching of Matsumoto and Blickenstaff combine with the teaching of Yamamoto wherein a reparse point is essentially a storage location for arbitrary data. Consequently, storing arbitrary data in this location allows for read/write on only designated data.

11. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Blickenstaff in view of U.S. Patent 5,802,020 issued to Kaneko et al. (hereafter "Kaneko").

Regarding claim 38, Blickenstaff teaches media management module further comprises logic which selects a medium based which of said plurality of media has a

side in the non-writeable state ("The data management system software of the present invention manages the flow of data files throughout the system", column 8, lines 51 – 53).

Blickenstaff does not explicitly teach plurality of media comprise double-sided media, each side of said media being designatable as being in either a writeable state or a non-writeable state

Kaneko teaches teach plurality of media comprise double-sided media, each side of said media being designatable as being in either a writeable state or a non-writeable state ("having tracks on both sides of the disk (A side, B side), two optical heads are set up so as to be able to simultaneously access facing the surfaces of both sides, the A side and the B side, of this optical disk. By accessing the B side from the outer circumference with many sectors per one track, in succession in the direction of the inner circumference from the outer circumference, and on the A side by accessing towards the outer circumference in succession from the inner circumference", column 2, lines 43 – 51).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified teaching of Blickenstaff combine with the teaching of Kaneko wherein software carry out data read/write processing on media inserted in drive devices. The double-sided media accommodate more data and this saves the high cost of increasing data storage capacity when frequent data migration is required.

12. Claims 6, 10, 13, 21, 22, 23, 27, 29, 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto in view of Kaneko.

Regarding claim 6, Matsumoto teaches plurality of media comprise double-sided media, each side of the double-sided media being separately designatable as being in a writeable state or a non-writeable state, and wherein said determining act comprises:

determining that no side of said plurality of media is in the writeable state and has sufficient space to store said specified data ("too many regular sectors are defective, empty areas gradually run out in the substitute sector, as a result of which data can not be written into the substitute sector any longer. In such a case, the controller writes the data into the management region by determining that no more data writing can be made to the substitute sector", see column 4, lines 11 – 16).

Matsumoto does not explicitly teach wherein said designating act comprises: identifying one of said double-sided media having a first side in the non-writeable state and having a second side whose state has not been designated; and designating said second side as being in the writeable state.

Kaneko teaches wherein said designating act comprises:

identifying one of said double-sided media having a first side in the non-writeable state ("having tracks on both sides of the disk (A side, B side)", colume 2, lines 43 – 44) and having a second side whose state has not been designated ("the constitution may be one bead, the optical disk drives 11a – 11f can record only the normal side single side", column 8, lines 14 – 16); and

designating said second side as being in the writeable state ("By accessing the B side from the outer circumference with many sector per one track", column 2, lines 46 – 47).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified teaching of Matsumoto combine with the teaching of Kaneko wherein identifying and designating the media prepare the media for read and write processing. The double-sided media accommodate more data and this saves the high cost of increasing data storage capacity when frequent data migration is required.

Regarding claim 10, Matsumoto does not explicitly teach identifying one or more data objects to be stored on said media.

Kaneko teaches identifying one or more data objects to be stored on said media ("A control unit 16a inserts optical disk cartridges, housed in predetermined housing units within the magazine, in specific optical disk drives, controls each optical disk drive, allocates data to be recorded to each optical disk, and moreover, combines the data played back from each disk", column 7, lines 4 – 7).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified teaching of Matsumoto combine with the teaching of Kaneko wherein identifying one or more data object are stored in the media. Selection of these objects for reading/writing to the memory is thus easily implemented.

Regarding claim 13, Matsumoto does not explicitly teach first number is equal to a number of drives associated with said system that are available for the migration of data, the number of drives available for migration being less than or equal to the total number of drives associated with the system.

Kaneko teaches first number is equal to a number of drives associated with said system that are available for the migration of data ("six optical disk drives 11a – 11f are arranged in the cabinet", column 6, lines 66 – 67), the number of drives available for migration being less than or equal to the total number of drives associated with the system ("in cases in which the number of optical disk cartridges is smaller than the number of optical disk drives (for example, in FIG. 5, in the case that the optical disk cartridges 46e, 46f are absent), it may be that no optical disk cartridges are inserted in the corresponding optical disk drives (optical disk drives 11e, 11f)", column 7, lines 30 – 37).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified teaching of Matsumoto combine with the teaching of Kaneko wherein six as in the illustrated example represents the concurrency value. The drive devices are activated concurrently in parallel fashion in order to carry out the data read/write processing while performing the data striping process.

Regarding claim 21, Matsumoto does not explicitly teach determining that the aggregate number of sides of said plurality of media that are in the writeable state is less than a first number

Kaneko teaches determining that the aggregate number of sides of said plurality of media that are in the writeable state is less than a first number ("Furthermore, in cases in which the number of optical disk cartridges is smaller than the number of optical disk" see column 9, lines 18 – 19).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified teaching of Matsumoto combine with the teaching of Kaneko wherein it may be that no optical disk cartridges are inserted in the corresponding optical disk drives hence the number of optical disk cartridges is smaller than the number of optical disk. The control unit recognizes the drives in which no optical disk cartridges are inserted. Advantageously, the control unit is capable of continued processing other than the empty disk drives.

Regarding claim 22, Kaneko teaches first number is equal to a number of drives associated with said system that are available for the migration of data (see column 9, lines 9 – 11).

Regarding claim 23, Matsumoto does not explicitly teach said data migration system includes a device having one or more drives which read and write said plurality of media, a library for the storage of media, and a robotic mechanism which mounts media stored in said library on said drives, said method further comprising: identifying, from among said plurality of media, a second set of media having a side in the writeable state and whose side in the writeable state has sufficient space to store said quantity of

data, said second set being different from said first set; and determining that each of said media in said second set is not located in said device

Kaneko teaches said data migration system includes a device having one or more drives which read and write said plurality of media, a library for the storage of media, and a robotic mechanism which mounts media stored in said library on said drives, said method further comprising:

identifying, from among said plurality of media, a second set of media having a side in the writeable state ("accessing the B side from the outer circumference with many sectors per one track', column 2, lines 46 – 48) and whose side in the writeable state has sufficient space to store said quantity of data ("allocates data to be recorded to each optical disk", column 7, lines 5 – 6), said second set being different from said first set ("By accessing the B side from the outer circumference with many sectors per one track, in succession in the direction of the inner circumference from the outer circumference, and on the A side by accessing towards the outer circumference in succession from the inner circumference, which has a small number of sectors per track", column 2, lines 46 – 52); and

determining that each of said media in said second set is not located in said device ("FIG. 4 is an exterior oblique view of a magazine used in the optical disk recording and playback device of the second embodiment of the present invention. As shown in FIG. 4, it is possible to house six optical disk cartridges in a magazine 41. Housing portions 45a-45f are housed in a case member 42 of the magazine 41. Optical

disks are respectively housed in optical disk cartridges 46a-46f", column 6, lines 31 – 37).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified teaching of Matsumoto combine with the teaching of Kaneko wherein identifying and designating the media for read and write processing. The double-sided media accommodate more data and this saves the high cost of increasing data storage capacity when frequent data migration is required.

Regarding claim 27, Matsumoto does not explicitly teach said media are mountable on one or more drives, said drives being associated with a device, said device having a library which stores media and a robotic mechanism which mounts media stored in said library on said drives, wherein said method further comprises: determining that said first medium is not stored in said library; and wherein said waiting act comprises: prompting a user to insert said first medium in said device.

Kaneko teaches said media are mountable on one or more drives, said drives being associated with a device, said device having a library which stores media and a robotic mechanism which mounts media stored in said library on said drives, wherein said method further comprises:

determining that said first medium is not stored in said library; and wherein said waiting act comprises ("Furthermore, a method of performing disk recording and playback, in cases in which large capacity memory is necessary, such as a so-called juke box type, one to four optical disks are introduced into a cabinet", see column 1,

lines 62 – 65): prompting a user to insert said first medium in said device ("thus requiring many users to insert one optical disk cartridge", see column 1, lines 58 – 59).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified teaching of Matsumoto combine with the teaching of Kaneko wherein so-called juke box type is library for a collect of optical disks. Introducing one to four optical disks are introduced into a cabinet, is a waiting process for inserting these optical disks into the juke box type cabinet by the user. Optical disks have the advantage of large data capacity and been removable.

Regarding claim 29, Matsumoto does not explicitly teach said media comprise double-sided media, each side of said media being designatable as being in a writeable state or a non writeable state, wherein said second medium comprises the second side of a medium having a first and a second side, said first side being in the non-writeable state and said second side not being designated as being in either the writeable or non-writeable state.

Kaneko teaches said media comprise double-sided media, each side of said media being designatable as being in a writeable state or a non writeable state ("having tracks on both sides of the disk (A side, B side)", column 2, lines 43 – 46), wherein said second medium comprises the second side of a medium having a first and a second side ("two optical heads are set up so as to be able to simultaneously access facing the surfaces of both sides, the A side and the B side, of this optical disk", column ("two optical heads are set up so as to be able to simultaneously access facing the surfaces

of both sides, the A side and the B side, of this optical disk", column 2, lines 44 – 46), said first side being in the non-writeable state ("and on the A side by accessing towards the outer circumference in succession from the inner circumference", column 2, lines 49 – 50) and said second side not being designated as being in either the writeable or non-writeable state ("accessing the B side from the outer circumference with many sectors per one track, in succession in the direction of the inner circumference from the outer circumference", column 2, lines 47 - 47).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified teaching of Matsumoto combine with the teaching of Kaneko wherein data read/write processing could be performed on the double-sided media. The double-sided media accommodate more data and this saves the high cost of increasing data storage capacity when frequent data migration is required.

Regarding claim 30, Matsumoto does not explicitly teach said first number comprises a number of drives available for writing data onto media.

Kaneko teaches said first number comprises a number of drives available for writing data onto media ("the respective conveyor units 12a-12f mount the six optical disk cartridges housed in the magazine 41 in the six optical disk drives", column 9, lines 9 – 11).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified teaching of Matsumoto combine with the teaching of Kaneko wherein six optical drives are available for processing. The drive devices are

activated concurrently in parallel fashion in order to carry out the data read/write processing while performing the data striping process.

13. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto and Kaneko in view of Yamamoto.

Regarding claim 9, Matsumoto or Kaneko does not explicitly teach each of said data objects is a file stored in a file system, and wherein said persisting act comprises: setting a reparse point in said file system for each of the files; and storing the location of each migrated file in the reparse point 20 corresponding to the migrated file.

Yamamoto teaches each of said data objects is a file stored in a file system, and wherein said persisting act comprises:

setting a reparse point in said file system for each of the files ("The serial interface 62 prescribes a protocol for performing arbitrary data transfer over three signal lines between the serial interface 62 and the plateshaped memory 1, that is, signal lines SCLK (serial clock signal), BS (bus state) and SDIO (serial data input/output)", column 5, lines 65 – 67 and column 6, lines 1 – 2); and

storing the location of each migrated file in the reparse point 20 corresponding to the migrated file ("the user can reproduce only an arbitrary track from among tracks recorded in one or a plurality of plate-shaped memories 1 loaded in the drive apparatus 20", column 16, lines 22 – 24).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified teaching of Matsumoto and Kaneko combine with the teaching of Yamamoto wherein a reparse point is essentially a storage location for arbitrary data. Consequently, storing arbitrary data in this location allows for read/write on only designated data.

14. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto in view of Yamamoto.

Regarding claim 8, Matsumoto does not explicitly teach specified data comprises a plurality of data objects, and wherein said method further comprises persisting in a memory the locations on which each of said data objects is stored.

Yamamoto teaches specified data comprises a plurality of data objects ("a plurality of media each including a memory element can be successively accessed to continuously write and/or read out data into and/or from the media", column 2, lines 8 - 10), and wherein said method further comprises persisting in a memory the locations on which each of said data objects is stored ("It is to be noted that the drive apparatus 20 handles various kinds of main data as an object of writing and reading out into and from the plate-shaped memory 1. The main data may be, for example, moving picture data, still picture data, audio data (voice data), HiFi audio data (music data) and control data", column 6, lines 11 - 13).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified teaching of Matsumoto combine with the teaching

of Yamamoto wherein data objects are stored in a specific location. Selection of these objects for reading/writing to the memory is thus easily implemented.

Conclusion

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fred I. Ehichioya whose telephone number is 703-305-8039. The examiner can normally be reached on M - F 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kim Y. Vu can be reached on 703-305-4393. The fax phone numbers for the organization where this application or proceeding is assigned are 703-746-7239 for regular communications and 703-746-7238 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-303-3900.

FE
March 9, 2003

KIM VU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100